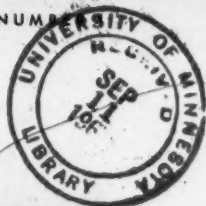




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3L **Clinical Proceedings**

OF THE

2L **CHILDREN'S HOSPITAL**

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^aGordon, H. H., and Ganson, A. E: *J. Pediat.* 54: 503 (April) 1959.

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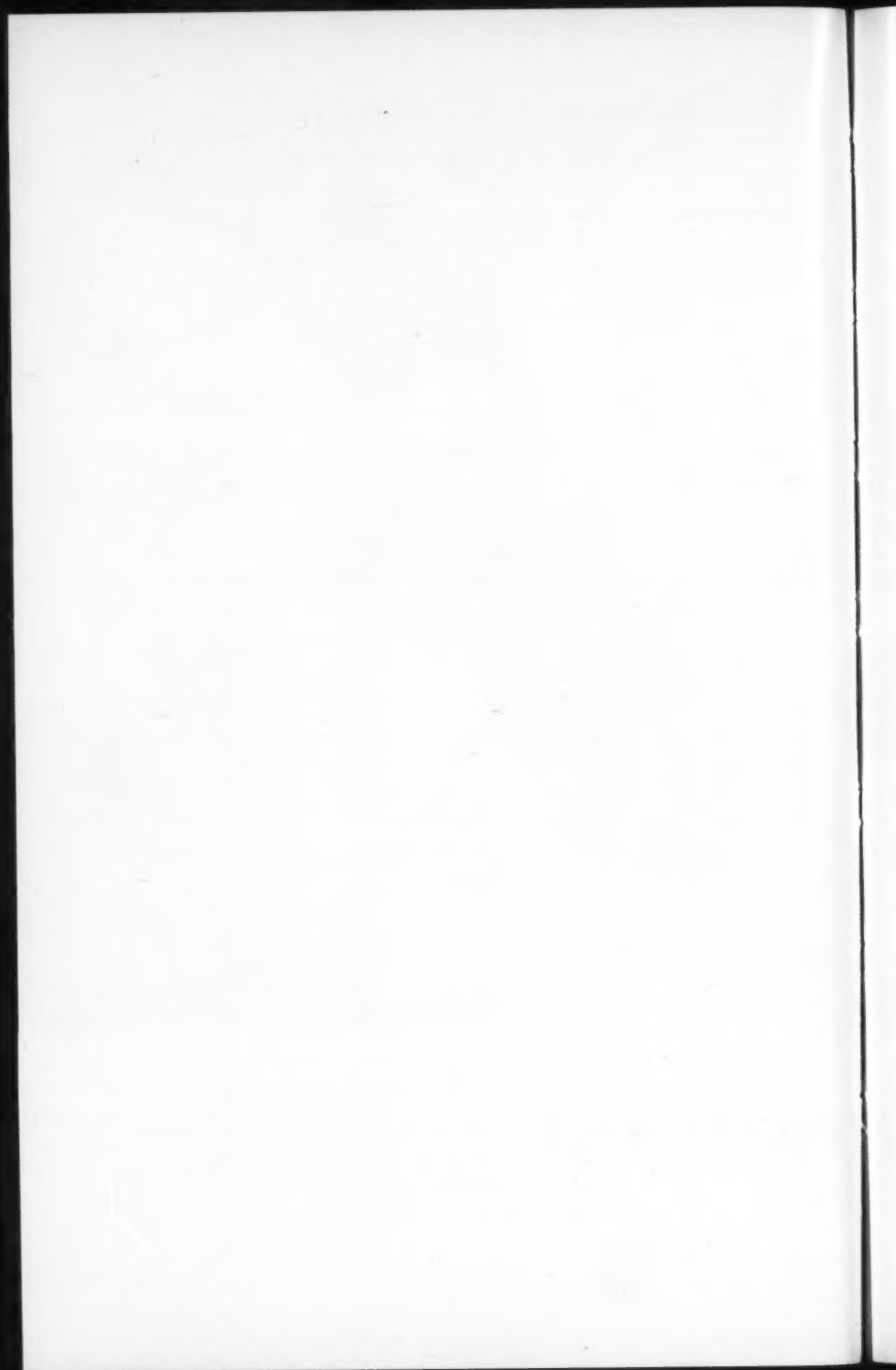
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SYMPOSIUM: IATROGENESIS PEDIATRICA*

Introductory Remarks

CAPTAIN T. E. CONE, JR., MC, U.S.N.**

What we intend to do is to deal with the physician's role in the care of the child, but our approach will be an unusual one; we will concentrate on the effect of the physician himself, either as an abettor or a producer of anxiety. Our gestures, grimaces, or groans may have inordinately important effects on the patient or his parents. In fact, these nonverbal aspects of communication may produce extremely serious parental anxiety, and in the long run, unfortunately, may be our most important contributions to our patients. The mass media of communication, as well as the cult of conforming to what is new may also lead to unexpected difficulties.

The title, "Iatrogenesis Pediatrica," was not coined to describe a bizarre or baffling pediatric condition but rather to describe and direct attention to a problem that has gained importance in the past quarter of a century. This period, as we all know, has witnessed unprecedented changes in the nature of pediatric practice; for example, the microbial diseases of childhood which were looked upon so ominously in the past are now viewed quite sanguinely. Regrettably, there is real danger at present that iatrogenic disorders may be replacing the diseases conquered so effectively by the newer chemotherapeutic and immunizing agents. Iatrogenic disorders are those unwittingly created by the physician when unwarranted importance is attached to minor deviations from the normal. Overemphasis of these supposed disorders may produce the same degree of parental anxiety as would the detection of a serious illness or abnormality in the child. It would be lamentable if we were to add unwarranted iatrogenic anxieties to the already existing tensions besetting parents in this troubled world. It must always be remembered that the definition of physician is "healer."

As the routine health examination of the well child has become more frequent, the physician has found time for more critical studies of the child than was possible in former years. The examination of the past, although thorough, usually had a focusing spot of interest and concern in the area or structure involved in the illness. Today the physical exami-

* The opinions or assertions contained herein are the private ones of the authors, and are not to be construed as official or reflecting the views of the Navy Department or the Naval Service at large.

** Chief, Pediatric Service, U. S. Naval Hospital, Bethesda, Maryland.

nation is approached with the same zeal as in the past but without the same focal point. This laudable zeal without its previous direction often leads to the overemphasis of normal deviants, the examiner honestly believing them to be abnormalities. This practice has become so common that some physicians consider the physical examination incomplete unless a variation from the "normal" has been detected. The crux of the whole problem is the definition of normal. To many it denotes the average or usual, but to hold this view is to borrow trouble. It would be prudent if one wishes to describe the average of a large series of observations to stick to the term "average." Washburn¹ has stated: "In the light of common observations or scientific research, we can state with great assurance that even the healthiest of children cannot be expected to conform to any one given type, that there is no such phenomenon as standardization in the human growing organism." Probably the most important thing learned by the pediatrician is that there are wide variations for almost any measurable phenomenon, and as a very simple example, the "normal" weight spread using the Wetzell type grid for an 8 year old boy, i.e. average weight plus and minus 2 standard deviations, is from 39 to 75 pounds. I think the statement may be accepted as a truism, "For if one were to examine any living specimen with more than usual effort, some abnormality would be detected."² For example, a flower might have a minor variation in the size or color of the petals, an animal a slight disparity in the length of the ears. These deviations usually have little or no effect on the health and life expectancy of the subject studied. No one has expressed this concept or idea more lucidly than Ralph Waldo Emerson when he wrote, "There is a crack in everything God has made."³

A large segment of the pediatric conditions for which patients seek advice consists actually of minor anatomic or physiologic variations within the normal range. The exaggerated overemphasis placed on these variations has created untold parental anxiety and unhappiness. This overemphasis is not unique to the United States. In a provocative review by Israel Gordon⁴ in England, the same type of anxiety and parental concern has been demonstrated. A few years ago Bakwin⁵ in a highly provocative paper entitled "Pseudodoxia Pediatrica" expressed his views of this matter in this way: "The physician eager to justify his function is rarely content to tell the parents of a child who comes for a health examination that the child has no defects that require correction; he finds flat feet, large tonsils, malocclusion, a heart murmur, a tight prepuce, poor nutrition and perhaps poor posture." Most of these, Bakwin says, are normal variants, but the physician often leads the patient's parents to unnecessary trouble, expense and anxiety by his prescription. Gordon, in the British article, in an attempt to define the normal child and the healthy child, was unable to come up

with a definition of health—an extremely difficult definition to develop. The World Health Organization has not yet defined to everyone's satisfaction what is meant by health. One group regards health as an ideal, an abstraction that is not to be sullied by association with disease. Health cannot be considered apart from disease any more than hot can be considered apart from cold, or good apart from bad. As an example of a perfectionist's view in one of the standard journals devoted to pediatrics:

The following features characterize a healthy child: the mucous membranes are pink in color; the facial expression is happy, often radiant, smiling frequently, the eyes bright, and responsive; the skin is smooth, elastic and covers a sufficient layer of subcutaneous fat to give the limbs a nice rounded appearance; the tissue turgor is normal; the muscles are well formed and their tonus is excellent; the limb bones are straight; the stance is well-balanced, erect, and graceful; the spine is straight and the shoulder girdles do not drop; the arches of the feet are well formed; the movements of limbs and body in walking and running are characterized by elasticity, agility, vigor and poise.⁶

This seems to me to be the description of an agile ballet dancer rather than the ordinary healthy school girl, were it not that ballet dancers are said by the experts to have flat feet.

The real danger of such an ideal, however, is that if a child does not conform to it, it is considered necessary to see that he does, and steps are taken accordingly. Thus, for example, if his conjunctivae are not pink enough, his legs are not straight enough, his soles are not arched enough, he must have iron by mouth, iron to his legs, and wedges to his shoes, and undergo unnecessary frequent examinations causing unnecessary expense and perhaps unnecessary parental concern. Finally, one may say that whether or not a certain procedure is performed is largely a function of the number of examiners who see a certain child rather than the pathogenicity of the area or organ examined. In an attempt to substantiate the point, Bakwin⁶ went into the New York City Public Schools and at random selected 1,000 eleven year old children. Of the 1,000 children, some 611 already had had tonsils and adenoids removed and 389 had not. These children were not ill. They were sitting in classrooms and were collected as they were, in their classes. The 389 were then sent to Doctor A who was not informed about the experiment; he was asked to pick out those children who should have their tonsils out. After examining the 389, Doctor A told 174 that their tonsils should come out. The remaining 215 were then sent to Doctor B who also was asked whether they should have their tonsils out. After Doctor B had finished with them, 99 were told that their tonsils must come out, and of the remaining 116 who went for a third examination, 51 were told that their tonsils must come out. Of the entire group, therefore,

only 65 were left. This perhaps illustrates that the decision to perform a procedure may well be primarily a function of the number of examiners.

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Theorem for Therapy—or to Treat or not to Treat

LIEUTENANT H. A. PEARSON, MC, U.S.N.* AND CAPTAIN T. E. CONE

The problem of deleterious reactions to medical therapeutics is doubtless as ancient as the medical profession. The Roman injunction *Caveat medicum nocere et sanare potest* bears witness to the existence of iatrogenic disease two milleniums ago.

During the 18th and early 19th centuries, the indefatigable purging, leeching and dosing which constituted medical therapeutics undoubtedly eased many a patient into an early grave. Opposition to these meddlesome practices found expression not only in the homeopathic doctrine of minute doses of drugs (which actually confirmed the ancient tenet that the *via medicatrix naturae* is often sufficient to cure disease) but also in the therapeutic nihilism which dominated medical thought until very recently. This concept was succinctly summarized by Dr. Oliver Wendell Holmes in his address to the Massachusetts Medical Society on May 30, 1860: "I firmly believe that if the whole materia medica as now used could be sunk to the bottom of the sea, it would be all the better for mankind—and all the worse for the fishes."

However, since the 1930's pharmacotherapeutics has emerged as the most important force of the modern medical era. Two potential dangers in this trend are clearly apparent: 1) the greater dependence of the modern physician upon drugs in his practice of medicine, and 2) the tremendous increase in the number of drugs available for his use.

* Pediatric Staff Officer, U. S. Naval Hospital, Bethesda, Maryland.

May¹ has recently stated that great courage is required to protect one's patients from gratuitous suggestions to do "something"—however poorly conceived, vaguely indicated or potentially harmful. He concludes by stating that we need to learn to say, "Don't just do something, stand there!"

Still another important trend has been abetted by the precision of the biochemist. Potent "principles" have been separated from vast amounts of inert carriers. Chemical molecules have been twisted and substituted to make them yet more potent. Polypharmaceutical practice with ever more powerful medications has made the problem of iatrogenic disease a real concern to all physicians. "Diseases of medical progress"² are seen in clearest form in drug-induced toxicities.

It is not our purpose to discuss the great ecological complications of modern drug therapy, such as the emergence of antibiotic-resistant staphylococci. These problems have been well described elsewhere.³ Rather, what concerns us is the individual physician and his pharmacologic relationship with an individual patient during a specific illness. To treat or not to treat—that is the burning question!

We have assembled into a unified statement what we consider the most important factors to be weighed before embarking upon any therapeutic program. In presenting this unified statement in the form of a mathematical formula, due acknowledgement must be made to the inspiration of Professor Parkinson⁴ whose writings have injected reason and order into so many of the trying complexities of our society.*

STATEMENT OF FORMULA

$$X = G \frac{\left(T - \frac{1}{\$}\right)^2 + (D_t - D_e) + (A_{dx} - \sum v)}{K(C_a)^2 + (C_e)(P)}$$

Legend

- a) G: Gravity of disease encountered.
- b) T: Time drug has been on market in fraction of a year. As a vast number of new medications are discontinued soon after their issuance, this factor provides an important index of merit.
- c) $\frac{1}{\$}$: The reciprocal of the amount of money spent on promotion and advertising by the drug firm; it is a well accepted proposition that the more worthless the drug, the harder the "sell."
- d) $(D_t - D_e)$: The toxic dose minus effective dose. This provides an estimate of the drug's margin of safety.
- e) A_{dx} : The accuracy of the diagnosis of condition being treated. This

* Parkinson's astute and scientific endeavors are not to be confused with the befuddling practices of Mathmanship as outlined by Vansberg.⁵

will vary with the experience and acumen of the individual physician and the complexity of the signs and symptoms.

- f) $\sum p$: Probability of spontaneous cure.
- g) C_s : Serious complications of drug.
- h) C_t : Trivial complications of drug.
- i) P: Placebo effect.
- j) This leaves only K. Considerable research is being performed on this factor in our laboratory. K is a variable constant which will include such features as: (1) the amount of medication expectorated by a struggling child; (2) the patient who is given a double draught on the assumption that if a little is good, more is better; (3) the physician with illegible handwriting, or one who inadvertently smudges the prescription so that the pharmacist can only estimate his intention.

In applying the formula, if X is greater than unity, the drug in question may be used in a specific illness. Any X value less than 1.0 precludes usage of the medication. Two examples will suffice. The use of chloramphenicol for undifferentiated viral upper respiratory illness is precluded, ($X = 0.18$). On the other hand, use of chloramphenicol in acute staphylococcal pneumonia of childhood is warranted, ($X = 2.32$).

This tentative mathematical formula may be altered on the basis of future findings. However, if physicians will consider factors such as those listed before prescribing a drug, however innocuous, drug-induced diseases of medical progress will cease to multiply. Indeed, they may even decrease in number.

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The Attitude of the Physician to his Patients—the Importance of the Grimace, Gesture, and Groan

LIEUTENANT K. W. SELL, MC, U.S.N.*

Every doctor has a fairly firm set of beliefs as to which illnesses are acceptable and which are not; how much pain, suffering and deprivation a patient should tolerate, and when he has the right to ask for help and relief; and how much of a nuisance the patient is allowed to make of himself, and to whom. Our apostolic creed does not end with this evaluation of the patient's appeal, but it attempts to guide our responses to the problems and the personalities of the patient himself. A good physician changes his attitude according to the needs of his patient. However, a small number of doctors tends to respond in stereotyped and therefore ineffective ways. Certain of these doctors have been categorized by Dr. Leo Kanner¹ as a source of iatrogenic disease, discomfort and woe to the families they treat. It must of necessity be pointed out that few of these exaggerated types exist in pure form, but it is certain that many physicians will find some of these characteristics affecting at least in part their own attitudes and actions in treating patients.

The first of these physician types that Dr. Kanner describes is the alarmist. This is the doctor who feels compelled to point out all the dire potentialities of a patient's disease. These doctors have of course a mental index in which they file the possible complications of various illnesses so that they can make plans as to further tests and examinations that may be necessary to insure a good outcome. Some, however, perpetually voice these ideas aloud to their patient, perhaps with the idea of impressing him with their medical skill or schooling. These discussions lead to overwhelming concern in the patient and may predispose to the stool-gazing, temperature-taking, pulse-counting mother, with the eventual result that permanent insecurity or, even more often, hypochondriasis will develop in the child. It is said by many that the largest portion of adult medicine deals with nonorganic disease. Perhaps this predisposition for somatization can be ascribed in part to the pediatrician who initiates maternal overconcern and childhood preoccupation with bodily parts. Unfortunately, these effects do not require the impetus of repeated contacts with the alarmist physician, but often result from a single contact resulting in an activation of an already latent oversolicitousness.

The alarmist can also ply his trade by the indirect but equally deva-

* Pediatric Staff Officer, U. S. Naval Hospital, Bethesda, Maryland.

stating method of the "touch" and the "verge." The child who has a "touch" of pneumonia or rheumatic fever or virus, or is "on the verge" of breakdown or encephalitis, assumes in the retrospective view of the parents a quite definite disease picture which offers an excellent excuse for the observation of the child's every moan and groan as a possible precursor of recurrent disease. An even greater possibility for this apprehension exists in the family when the poorly defined diagnosis of a "nervous condition" is given to the parents. This can result in fears from anything from insanity to psychopathic behavior and sexual misadventures. Therefore the relatively innocuous and common symptoms of enuresis, thumb sucking and masturbation will later assume the role of corroborative evidence from the mother who reflects that the doctor was right all the time, and the child goes on his way to perversion and delinquency.

An even more subtle and frequent form that the alarmist can assume is in the field of nonverbal communication. The murmur while looking at the tonsils, the lingering during the heart examination, the shaking of the head when looking at the normal infantile bowed legs, all may have a much more lasting effect on the patient than the very bland reassurances given the parent later on. How much untold damage is done to a child and his family by mentioning the innocuous heart murmur which in no way jeopardizes the child's health.

It must be realized, however, that we have injected the zeal of preventive medicine into our society. For many years physicians in general, and pediatricians in particular, have made great advances to insure longer life and better health for everyone through the use of prophylactic immunization, sanitation, better nutrition and, more recently, the institution of routine physical examination. Our main method of persuasion to get the family to partake of this preventive medicine, however, has been to view with alarm the terrible potentialities of noncompliance. Our attitude in raising our children has naturally followed a similar logic, and the main responsibility is directed towards prevention of illness rather than maintenance of the healthy child.

Prevention, *per se*, of course is not bad, but we have much to learn about the normal range of variations. As pediatricians, we often feel negligent unless we use special shoes for toddlers and their flat feet, even though we know that it is impossible to evaluate the longitudinal arch of a child until he has been walking for several months. We put special shoes and braces on children with bowed legs, although it has been shown quite conclusively that if the distance between the knees is no more than 3 inches these children will most probably assume normal stature later on in life. We remove the child's tonsils after one or two attacks of tonsillitis, despite the fact that we rarely measure the child's ability to hear. We put children in

abductive casts and pillow splints to prevent dislocated hips, despite the fact that the diagnosis of the predisposition cannot be made by any known clinical or radiologic means. It is heartening and true, however, that most doctors are swinging away from these pseudopreventive practices. Of equal importance is the necessity to change our impetus for the prevention of disease from the fearful alarm of future possibilities to the more healthy concept of keeping the child healthy now.

A second type of physician is the polypragmatist. In a way this doctor is also an alarmist although the alarm seems to reside within himself. His all-encompassing attack includes such things as tonics, sedatives, repeated vitamin B₁₂ injections, enemas and restrictive diets, all intended to leave no doubt as to the thoroughness of his medical care. Assuredly, we all sometimes prescribe drugs to assuage the family by showing that something is being done, but in these cases we must be honest with ourselves and realize that in these instances we are practicing placebo medicine.

In prescribing placebos we must also realize that the ever-present accompanying drug that is of most importance is the judicious use of ourselves. The doctor as a drug is not a new concept but one that must be kept in mind. Unfortunately, the polypragmatist tries to rationalize his overuse of drugs rather than accept their placebo value. He also tends to use dangerous drugs when a true placebo or an innocuous drug would be much more acceptable. An example of this, perhaps, is the use of a broad spectrum antibiotic in measles, despite the fact that in a well controlled study by Weinstein,² the incidence of complications of measles was the same in a group treated with antibiotics and a group not treated with antibiotics; in fact, more severe complications, mainly staphylococcal pneumonia, occurred after the use of antibiotics.

The third of these physician-types is the demonstrator. This type feels either a great need to impress the patient with his ability or, conversely, is so lacking in confidence that he feels the need for corroborative demonstrations directly from x-rays, medical articles and such to convince the patient of the correctness of his diagnosis. With thoughtful explanation accompanying these demonstrations, the result will be a well informed patient or parent. However, the accumulation of confusing medical terms, strange x-rays, and explanations dotted with medical jargon may well result in a patient who has the impression that he is not long for this world.

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Iatrogenic Aspects of Laboratory Procedures

LIEUTENANT G. J. A. MAGNANT, MC, U.S.N.*

Of all the factors incriminated in iatrogenic disease, laboratory tests and procedures probably play the smallest role. Laboratory data, in general, are used to confirm a clinical impression, and rarely do they in themselves make a diagnosis. In the absence of clinical or historical evidence of disease, abnormal laboratory findings should be examined very critically. There are three generic types of determinations which furnish data: qualitative, semiquantitative and quantitative. Qualitative determinations are unrefined and possibly nonspecific procedures, frequently of great value in screening or in diagnosis. Thus, presence of gross blood in feces, urine, or vomitus requires no more than visual observation for detection. However, qualitative determinations have inevitable limitations which require full recognition; for example, the observation of blood in the vomitus without further information concerning the patient may not indicate whether the bleeding is of a minor nature or of a magnitude which threatens the life of the patient.

Data of semiquantitative accuracy are frequently as valuable as information obtained from more refined tests. This is evident by the enormous number of tests reported in terms of degree of positivity, such as one to four plus. This is probably the greatest abuse in the evaluation of data: the interpretation of semiquantitative results as though they were quantitatively accurate within strict limits of normal. Some of the most ridiculous and frequent errors concern the determination of hemoglobin. In this instance many clinical methods are semiquantitative as employed, if the reproducibility of results varies within the range of plus or minus 15 per cent. The continual discovery of quantitative tests having no limits of significance for the establishment of diagnosis and treatment is evidence of increasing appreciation of the scientific method in medicine.

The limitation of quantitative determinations in medicine results largely from the failure to appreciate the limited significance of the particular methods in the hands of a particular examiner and as determined on a particular sample. For example, Belk and Sunderman¹ sent carefully prepared duplicate samples of known solutions to 59 different laboratories in Pennsylvania for quantitative analysis. To say that the range of results was wide is an understatement. One sample contained 45 mg. per 100 ml. of urea, but at least 25 per cent of the laboratories reported results within the normal body range. It is interesting to note that according to the

* Pediatric Staff Officer, U. S. Naval Hospital, Bethesda, Maryland.

results reported for the glucose sample, the patient was simultaneously in insulin shock and severe diabetic acidosis, depending upon which laboratory was reporting.

Other specific points could be made: the diagnosis of anemia made because a fixed figure is used for the hemoglobin norm and not enough latitude is given to the range of normal; the diagnosis of rheumatic fever made on the basis of a functional murmur coupled with a few days of unexplained fever, a leukocytosis, and an elevated sedimentation rate; the diagnosis of epilepsy made on the basis of a simple fainting spell coupled with a minor electrical abnormality in the electroencephalogram; and last but not least, obese children diagnosed as hypothyroid because of a low basal metabolic rate, the apparatus for which, thank goodness, has been relegated to the broom closet in most institutions.

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Other Common Problems of an Iatrogenic Nature

CAPTAIN T. E. CONE

The so-called orthopedic defects produce a tremendous parental anxiety and in the opinion of many physicians are second only to the problem of the tonsils and adenoids in this respect. Flat feet, either actual or potential, are commonly diagnosed because a physician fails to realize that the normal feet of young children and infants may appear grossly abnormal because of the plantar fat pad and the undeveloped muscles, tendons and ligaments which support the arches. The question of when a foot is pigeon-toed and when it is not seems to be of great concern to many parents, and if one is not particularly worried in his own mind about the degree of the pigeon-toeing, one might point out that the Olympic team walkers all walk with a toeing-in gait; so do the American Indians. Likewise the normal forward inclination of the pelvis in a healthy young child gives the appearance of a lumbar lordosis; failure to appreciate the normality of this lordosis is sometimes cause for referral to an orthopedist. It is axiomatic,

however, that if a questionable orthopedic defect is noted during the physical examination, it would be judicious to obtain the opinion of an orthopedist before the patient or the parent is alarmed. This may spare the child from wearing an unnecessary orthopedic device, and the parents a great deal of anxiety.

Of all the iatrogenic disorders none has caused greater parental misery than the misdiagnosis of a functional heart murmur. Untold numbers of families have been thrown into panic and the child committed to the life of a cardiac invalid because the physician failed to realize that almost all murmurs detected for the first time in the routine health examination of the otherwise healthy child are the so-called functional or accidental type. Cardiologists, of course, consider these as inconsequential murmurs. The physician should never be hesitant about seeking the opinion of a cardiologist concerning the nature of a murmur heard during a routine health examination. By getting such a consultation the parents may be spared a tragic experience and the child protected from developing a cardiac neurosis.

There is in addition, a gamut of frequently noted "disorders" which depend upon the examiner's range of normality and his own feelings in the matter. A few common examples may be listed; undue anxiety about any of these is unjustified:

- 1) The flat hemangiomatous areas found on the eyelids, the nose, the upper lips, and at the nape of the neck of the newborn—most of these eventually fade.

- 2) The Mongolian blue spots seen frequently over the buttocks and back in dark-skinned infants.

- 3) The bald patch frequently found on the occiput.

- 4) The yellow skin noted in carotenemia (a pale sulfur-yellow color of the whole body, but not the sclerae, and especially pronounced about the nose, the palms, and the soles of the feet).

- 5) The craniotabes that may be noted normally at the vertex of the skull in the parietal area near the sagittal suture in the young infant.

- 6) The frequent overriding of the parietal bones over the occipital and frontal bones in infants which may cause much unnecessary concern about the potential development of craniostenosis.

- 7) The anterior fontanel, or so-called soft spot, which may normally be depressed and vary markedly in size. Closure may occur within the first six months of life, or it may be delayed until beyond 18 months of age.

- 8) The wide variation in order and time of eruption of deciduous teeth.

- 9) The "glassy" appearance of the eyes of a normal newborn; the whitish

discharge in the inner canthus due to the narrow nasolachrymal duct; a congenitally cone-shaped cornea with the child going on to develop normal vision; the appearance of blue sclerae in the newborn which is almost always a normal variant rather than an indication of fragilitas osseum.

10) Minor imperfections noted in the mouth and pharynx of a healthy child such as the geographic tongue, bifid uvula, and small, thin, grayish streaks on the tonsillar crypts and follicles.

11) A prominent xyphoid process which is frequently observed and occasionally misdiagnosed as a tumor. In the neonatal period, abdominal respiration with minimal thoracic movement; at this age the respiratory movements are also usually irregular, both in depth and frequency. Cog-wheel or periodic breathing, suggestive of pathologic states, may also be occasionally noted in the healthy infant.

12) Engorgement as well as a thin watery discharge from the nipple of the neonate.

13) The umbilical herniations seen in the Negro race; these are also normal variants. Dr. E. Perry Crump, Professor of Pediatrics at Meharry Medical School, has a wonderful series of photographs of ebony figures, all of which have umbilical hernias; these are the work of native craftsmen and are not in any way considered as abnormal. The normal umbilicus may be depressed, be level with the abdominal wall, or may protrude, but it does not enlarge with an increase in the intra-abdominal pressure.

14) A palpable liver and spleen in healthy infants and young children. Fecal accumulations which may be felt through the abdominal wall, and which should be considered before making a diagnosis of a serious intra-abdominal mass.

15) The penis which will vary in size without functional significance. The penis may appear abnormally small with only the foreskin visible, especially in the obese child. The newborn foreskin is usually adherent and appears to be tight at the end; in most parts of the world this is not an indication for circumcision. There is a great variation in the size of the scrotum and testes. The small hydroceles frequently detected in the child and young infant usually require no treatment because the vast majority recede spontaneously. In the female infant and young child, the labia minora may be quite prominent without pathological significance. The newborn female may have a slight "bloody show" from the vagina. This has no significance unless it is part of hemorrhagic disease of the newborn.

In conclusion, it may be said that a large part of the present day pediatric practice consists of parental concern about many normal anatomic and physiologic variations often found in healthy children. The failure of

some physicians and parents to appreciate the wide latitude of normality has focused unwarranted concern on these variants, and both physicians and parents need reorientation about the significance of these universal imperfections that do not impair the child's health.

Perhaps the trouble lies with the cousins called Euphemia who plague us daily. Although it is a jocular quotation, I would like to read Ogden Nash's "Cousin Euphemia Knows Best, or Physician, Heal Somebody Else,"* because I think Nash hit the nail pretty much on the head in explaining how we may get caught in a trap vis-a-vis the parents who consult us:

Some people don't want to be doctors because they think doctors don't make
a good living,

And also get called away from their bed at night and from their dinner on
Christmas and Thanksgiving,

And other people don't want to be doctors because a doctor's friends never
take their symptoms to his office at ten dollars a throw but insert them
into a friendly game of gin rummy or backgammon,

And ask questions about their blood count just as the doctor is lining up an
elusive putt or an elusive salmon.

These considerations do not influence me a particle;

I do not want to be a doctor simply because somewhere in the family of every
patient is a female who has read an article.

You remove a youngster's tonsils and the result is a triumph of medical and
surgical science,

He stops coughing and sniffing and gains eleven pounds and gets elected
captain of the Junior Giants,

But his great aunt spreads the word that you are a quack,

Because she read an article in the paper last Sunday where some Rumanian
savant stated that tonsillectomy is a thing of the past and the Balkan
hospitals are bulging with people standing in line to have their tonsils
put back.

You suggest calamine lotion for the baby's prickly heat,

And you are at once relegated to the back seat,

Because its grandmother's cousin has seen an article in the "Household
Hints" department of *Winning Parchesi* that says the only remedy for
prickly heat is homogenized streptomycin.

And somebody's sister-in-law has seen an article where the pathologist of
Better Houses and Trailers says calamine lotion is out, a conscientious
medicine man wouldn't apply calamine lotion to an itching bison.

I once read an unwritten article by a doctor saying there is only one cure
for a patient's female relative who has read an article:

A hatpin in the left ventricle of the hearticle.

* Copyright 1948 by Ogden Nash. First published in *The New Yorker*.

Juvenile Hyperthyroidism

Discussion by: HESKEL M. HADDAD, M.D.*

Case report by: NICHOLAS HARITOS, M.D.**

This report contributes to the literature another case of juvenile hyperthyroidism, a relatively uncommon condition. The clinical course of the disease is discussed and the recent trends in diagnosis and therapy are reviewed.

CASE REPORT

A 10 year old Negro girl was brought to the Children's Hospital Outpatient Department May 29, 1959, at which time she was admitted because of an enlargement in the neck of two weeks' duration. Prior to noting the mass her mother had not noticed any other signs or symptoms. However, on further questioning, she did admit that the child had been increasingly nervous and irritable in the year prior to admission when her school work had suffered, and she had had to repeat the year in the same grade. Her appetite was good but had definitely increased in the six months prior to admission without any noted weight gain. There were no sleep disturbances, skin or hair changes, excessive sweating, palpitation or gastrointestinal symptoms.

The patient was born in Florida and lived there for three years before she moved to the District of Columbia in 1952. Past history and family history were noncontributory. There was no history of thyroid disease in the family.

Physical examination showed a 10 year old Negro girl who was well developed but thin. A readily noticeable goiter was present. She was hyperactive, but alert and cooperative, and in no acute distress. Her oral temperature was 100.2°F., pulse 130, respirations 24, and blood pressure 130/64. The hair was of fine texture; the skin was smooth and warm. The eyes were slightly prominent; there was a transient but definite lid lag. The thyroid gland was diffusely enlarged, easily palpable and not nodular. It measured 9½ cm. in width, and each lobe was about 6 cm. in length. A slight bruit was heard and a thrill was palpable over the thyroid area. There were fine tremors of the fingers and tongue. The quadriceps endurance time was 35 seconds.

Routine blood count and urinalysis were normal. A serum cholesterol done on admission was 110 mg. per 100 ml. Serum protein bound iodine was 19.8 micrograms per 100 ml. This was repeated at the National Institutes of Health and was found to be 24 micrograms per 100 ml. Serum butanol extractable iodine was 15.6 micrograms per 100 ml.

On the third hospital day, treatment with methimazole (Tapazole®), 10 mg. every eight hours, was instituted. The child's course in the hospital was uneventful except for occasional low grade temperature elevation. Her pulse ranged from 120 to 130 per minute during the day, but her sleeping pulse fell to 70 per minute. Her blood pressure remained between 130 and 140 systolic and between 70 and 80 diastolic. After 10 days of treatment the hand tremors decreased, and the quadriceps endurance time

* Pediatrician, Section of Clinical Endocrinology, National Heart Institute, National Institutes of Health, Bethesda, Maryland.

** Assistant Chief Resident, Children's Hospital.

gradually increased to 160 seconds (normal control 180 seconds). The patient was discharged from the hospital on June 16 with a follow-up planned.

DISCUSSION

This patient demonstrates rather a clear-cut clinical picture of hyperthyroidism, or thyrotoxicosis, as it presents in children. Hyperthyroidism is a much less common condition in children than it is in adults, and the incidence of the disease in childhood seems to increase with an increase in age, so that about 70 per cent of the juvenile cases occur during pubescence, i.e., between the ages of 9 and 15 years.¹ This increased incidence may be related to the sudden increase in the growth increments of the child during pubescence, as Talbot and Sobel² assume. It could also be linked to the significant hormonal changes associated with puberty, which probably would involve the thyroid function and the thyrotropic hormone secretion as well.

Emotional instability and nervous strain have been blamed for the etiology of thyrotoxicosis. There is a greater tendency for girls to acquire the disease than boys, the incidence being seven females to one male. This condition also seems to bear a familial tendency, since about 30 per cent of the cases have a positive history of thyroid disease in the family.¹

In children, hyperfunction of the thyroid seems to be secondary to extrathyroidal stimulants, and is due most probably to an excess of thyrotropic hormone. Toxic adenoma as seen in adults is seldom found in children.

Clinical Picture

The clinical picture of this condition is not always easy to recognize, especially early in the course of the disease. Thyroid gland enlargement is usually not an early symptom; in only about one third of the cases is there an early onset of goiter. The child seldom has any complaints; complaints come from the teacher or the parents. The child who has been more or less quiet and doing very well in school gradually becomes irritable and nervous, shows excessive movements, and cannot sit still in class or watch television. One of our patients was so hyperactive she fell off her bed while in the hospital. A child with this condition may actually need to be sedated and restrained. These patients also become emotionally unstable and develop a very labile mood. They seem to cry for the slightest reason. With such a hyperactive child, confusion may develop in differentiating this condition and Sydenham's chorea (due to rheumatic fever). Clinically speaking, the movements of the thyrotoxic child differ from the purposeless athetoid movement of chorea by their good coordination and conscious control by the patient.

Tremors in a child with hyperthyroidism may be fine or very coarse.

They are best demonstrated when the patient is asked to extend the hands. Often the whole body of the patient may be seen trembling.

The complaints of palpitation, dyspnea, and undue fatigue often described by adults are seldom complained of by thyrotoxic children. The mother, however, might say that the child's heart beats quite rapidly since the pulse in such children is over 120 in the majority of cases. Usually there is a hypertension with a systolic blood pressure ranging between 120 and 190, and a diastolic pressure remaining within normal limits or becoming slightly elevated. Consequently there is a rise in pulse pressure to between 40 and 110. This elevated pulse pressure is due to an increase in the peripheral circulation resulting from excessive thyroid hormone in the body. Capillaries open widely and produce what amounts to multitudes of tiny arteriovenous fistulae. Thus, frequently there is flushing of the face, the skin is usually warm, and there is hyperhidrosis, especially of the palms. Sweating may be quite profuse; the child may need to change pajamas during the night. Heat intolerance is a common complaint. In the colder seasons the child may prefer to keep the windows open and may refuse to be covered.

In some patients a systolic murmur over the precordium may be heard; it usually disappears after treatment is instituted. The heart is sometimes enlarged, as determined by fluoroscopy, and in rare instances, especially in infancy, heart failure may ensue. Heart failure due to thyrotoxicosis is difficult to control with digitalis unless the thyroid gland is suppressed.

Even though goiter appears as an initial symptom in only one third of cases of hyperthyroidism, it is present sooner or later in every child who has the disease. The goiter is usually diffuse and the gland is firm in consistency, with a smooth surface, and not nodular. There is usually pulsation to be seen, a thrill to be palpated and often a bruit to be heard.

In children exophthalmos is rather rare and, if it is present, never so pronounced as it is in adults. Particularly in Negroes a certain degree of prominence of the eyes may be a familial or racial trait. In all cases, however, a widening of the palpebral fissure is noticed, as if the child is staring. The signs described in the literature as characteristic of exophthalmos in adults: Moebius' sign, or lack of convergence; von Graefe's sign, or lid lag, and Joffroy's sign, or absence of wrinkling of the forehead when looking upward, are unreliable in children. Stellwag's sign, or reduced blinking of the eyelids, is not seen in children; in fact, blinking is often increased in the child due to increased irritability and hyperactivity.

Growth may become advanced in hyperthyroidism. Of 26 hyperthyroid children, 19 had an increased height for their age.* Bone age, on the other

* From unpublished data of L. Wilkins and the author.

hand, was advanced in only 7 out of 15 children whose osseous development was examined. More than half of the children who showed advanced height and bone age were in puberty, and the majority of them were examined at least six months after the onset of the disease, as determined by history. It is possible, therefore, that the advance in linear and osseous growth in some of the patients is just a manifestation of the normal variation in growth spurt at puberty. The influence of prolonged exposure to excessive levels of thyroid hormone in the body could not be excluded as the cause for growth advancement in some of these children. The same influence may be blamed for the rapid growth of the nails as observed in thyrotoxic children.

Gastrointestinal symptoms, such as loose bowel movements and sometimes vomiting, are not uncommon in hyperthyroidism. Weight gain is inversely proportional to the voracious appetite thyrotoxic children have. None of them has a really poor appetite; if the appetite is not average it is usually very good.

Diagnosis

The first step in diagnosis is the determination of the level of thyroid hormone in the blood (table 1). The protein bound iodine (PBI) is a reliable test unless the patient has ingested an iodine compound; merely painting the skin with tincture of iodine prior to venipuncture is enough to contaminate the syringe and thus raise the protein bound iodine values to thyrotoxic levels. When contamination is suspected, the determination of butanol extractable iodine (BEI) may be helpful. In this test presumably only the iodinated hormones of the thyroid are extracted.

The next step, and probably the most diagnostic one, is a determination of the radioactive iodine uptake by the thyroid gland. In recent years, if a good counting device is available, as little as 10 microcuries of I^{131} or even

TABLE 1
Values for Selected Laboratory Tests Used in the Diagnosis of Hyperthyroidism

	Euthyroid	Hyperthyroid
PBI (μ g. %)	4-8	9 and above
BEI (μ g. %)	3-7	8 and above
I^{131} uptake (%)		
1 hour	5-20	15-75
24 hours	15-40	40-90
Plasma $\frac{PBI^{131}}{I^{131}}$ conversion ratio (%)	30-40	50-100

less can be given. The significant part of this diagnostic test is the slope of uptake of intravenously-given radioactive iodine. Even in one hour the thyroid gland of the euthyroid individual retains 5 to 20 per cent of the injected dose, while the gland of the hyperthyroid individual may retain 15 to 75 per cent³ (see table 1). Because of this, I^{132} , which has a much shorter half life than I^{131} , may be used for radioactive uptake determination in order to further minimize the effects of irradiation. The 24 hour uptake is also increased to over 40 per cent of the injected dose. This increase in thyroid uptake of I^{131} is due not only to enhanced trapping of the radioactive iodine in the thyroid of the thyrotoxic individual but also to the rapid turnover of the radioactive thyroid hormone which is formed in the thyroid with the resultant liberation of extra radioactive iodine to return to the thyroid gland.

Another valuable test is the PBI^{131} conversion ratio (see table 1). In the normal individual, about 30 to 40 per cent of the radioactivity in the plasma is incorporated into circulating thyroid hormone within 24 hours. In the hyperthyroid individual, up to 100 per cent of the I^{131} may be present in the plasma in the protein precipitate fraction as thyroid hormone.

The serum cholesterol determination is unreliable for diagnosis even though it is usually low. Nonetheless, the serum cholesterol is helpful in follow-up therapy. When the patient's condition reverts to euthyroidism, cholesterol level in the serum remains normal; however, it becomes rapidly elevated when the patient becomes hypothyroid.

Treatment

The first drug used in the treatment of hyperthyroidism and the one most popular before 1946 was Lugol's iodine solution. Iodine suppresses thyroid activity, but unfortunately does not suppress it for a long enough period to effect continuous remission. The thyroid gland eventually breaks down the barrier, and a thyroid crisis may ensue. The patient suddenly develops high fever, excessive irritability, prostration and sometimes death. The only present day therapeutic value of Lugol's solution in hyperthyroidism is its use in the preoperative preparation of the patient. Lugol's solution is given for two or three weeks before thyroidectomy to reduce the vascularity of the gland and make it firmer and easier to cut.

Since 1946, propylthiouracil and other thiourea derivatives have been found to be effective blocking agents to the synthesis of thyroid hormone in the gland. Hence, propylthiouracil has been used for the treatment of thyrotoxicosis in dosage averaging 100 mg. three times daily for at least four months. When the patient emerges into a euthyroid status, a maintenance dosage of about 50 mg. twice a day should be instituted for at least two years, and sometimes longer.⁴ These dosages are by no means

rigid. They can be reduced or increased according to the response of the patient. Occasionally, up to 600 mg. may be required initially for two to three weeks until the critical state of hyperthyroidism subsides.

Propylthiouracil has been criticized because of the high incidence of toxicity. Toxicity in children is not very common and occurs in less than two per cent.⁴ Those who are sensitive to propylthiouracil usually develop drug rashes soon after therapy is begun. In such cases the drug should be discontinued immediately. The most serious complication, however, is granulocytopenia. Frequent white cell count determinations do not seem as necessary as reported if the parent is warned to watch the child and report any development of fever, sore throat, ulcerations in the mouth, skin rash, etc. If these are accompanied by a depression of the blood white cell count the drug should be discontinued and other means of therapy should be tried.

If the patient remains in complete remission for two years while on propylthiouracil therapy, the dosage may be gradually tapered down to 50 mg. daily for two or four weeks and then discontinued completely. If the patient does not relapse within six months after discontinuation of treatment the condition is considered cured. Most relapses occur within the first six months. In a relapse, the child again becomes hyperactive. Other symptoms and signs of toxic goiter may recur, and the protein bound iodine again begins to rise. Drug therapy can then be reinstated for a longer period until it is safe to stop it. If there is no toxicity, there is no harm in giving it for a period longer than three years.

Because of the incidence of toxicity to propylthiouracil, methimazole, which is believed to be a less toxic drug, may be used. Because it is about ten times as potent as propylthiouracil, the initial dosage of methimazole is usually between 30 to 45 mg. a day and the maintenance dosage between 10 to 20 mg. a day, divided into two or three doses.

In recent years, the sodium and potassium salts of perchlorate have been used with good success in the treatment of thyrotoxicosis in adults.⁵ In children perchlorate is still in an experimental stage.⁶ Sodium perchlorate is more soluble than potassium perchlorate and can be given in a more concentrated solution. It is not to be given in capsules or in the dry form because it can cause gastric irritation. Perchlorate is quite potent and reduces the thyroid activity quite rapidly. At an initial dosage of 0.25 to 0.5 Gm. of perchlorate, four times daily, quick suppression of the thyroid gland may be induced within six weeks to three months, after which a maintenance dosage of 0.25 Gm., two to four times daily, can be instituted. Therapy with perchlorate should be continued for two to three years and sometimes longer. With this drug there is a higher incidence of secondary goiter which does have a tendency to disappear spontaneously as does the

goiter resulting from methimazole or propylthiouracil. Thyroid hormone, as desiccated thyroid extract, in dosage of 1 to 2 grains daily has been found to be a good adjunct to antithyroid therapy in order to effect a reduction in the size of the secondary goiter. Since perchlorate is still in the experimental stage in children, perhaps the recommended dosage is excessively large. Trial of lesser dosage in the future may decrease the incidence of goiter. Even though perchlorate is a safe drug, in nine children treated with perchlorate, one developed a drug rash.⁶ Perchlorate, propylthiouracil and methimazole seem to pass the placental barrier and induce goiter formation and hypothyroidism in the fetus. A similar danger may exist if these drugs are given to a nursing mother, since they can be recovered in milk.

Radioactive iodine is used for the treatment of hyperthyroidism in adults, especially in cases where surgery is contraindicated. It should not be used in the treatment of juvenile cases because of the potential adverse effects of irradiation in children.

Thyroidectomy should not be recommended lightheartedly for hyperthyroidism in children. Surgery should be reserved only for certain indications: 1) when treatment with antithyroidal drugs has failed. Since the advent of perchlorate, however, it has been found that many of those patients who failed to respond to propylthiouracil or methimazole respond rather well to perchlorate salts; 2) when there is toxicity to propylthiouracil and methimazole. Here again, perchlorate may be of use to avert surgical intervention; 3) when there are frequent relapses while on medication; and 4) when there is failure of cooperation of the patient or the parents in the administration of the medication.

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The Use of Skin Traction in the Respiratory Distress Syndrome of Newborn Infants

GEORGE R. SPENCE, M.D.*

Respiratory distress in the newborn infant is not infrequent. Hyaline membrane disease alone is responsible for 25,000 deaths each year in this country.

The infant with respiratory distress in the newborn period is often desperately ill. After providing warmth, moisture, oxygen, and occasionally stimulants, the physician must decide whether "masterful inactivity" is the best treatment or whether an attempt should be made to improve the respiratory exchange in some manner to tide the infant over the critical period. If even a small improvement can be realized in reducing the mortality, such an effort should gain universal acceptance.

The use of skeletal and skin traction to counteract sternal retraction and collapse of the rib cage in this condition is not new. However, the practice has not received general acceptance, perhaps because of the reluctance of pediatricians and obstetricians further to traumatize an already gravely ill infant, or perhaps because some of the methods require special apparatus not immediately available.

Assuming the infant is already in an isolette or similar incubator, all that is needed is a towel forceps and a rubber band. The towel forceps is used to pick up a "good bite" of skin over the lower portion of the sternum. Tension is maintained by connecting the forceps by means of a rubber band to the top of the incubator. The inspiratory retraction of the sternum is thus counteracted.

CASE REPORT

A premature male infant weighing 3 pounds 7 ounces and of 32 weeks gestation was delivered at Columbia Hospital for Women, Washington, D. C., on September 21, 1959 at 5:00 A.M. It was the mother's fourth pregnancy; labor lasted 4 hours 4 minutes, and the presentation was double footling. The nasopharynx and stomach were suctioned, and the baby was sent to the premature nursery. At 6:25 A.M., it was noted that the color was poor and the sternum was retracting on inspiration. The retractions became more severe, and the breathing extremely labored. The color was ashen gray, and cyanosis of the lips and extremities was noted. The infant appeared "terminal" at 10:00 A.M. in spite of high humidity, high oxygen and administration of caffeine with sodium benzoate.

At this time a traction apparatus was attached to the skin over the lower end of the sternum. The apparatus consisted of a Buckhous towel forceps suspended from the top of the incubator by a rubber band. The prongs of the forceps were clipped

* Associate Staff, Children's Hospital.

into the skin and the band adjusted to exert traction on the skin of the lower sternal region.

Almost immediately the color began to improve, and respirations became much more effective. The infant, of course, was still in a precarious condition, but the cyanosis was never again prolonged or severe. The infant was given 12.5 mg. of hydrocortisone acetate every six hours for three doses, then every 12 hours for two doses, in hope that the stress situation might be minimized and the possible development of sclerema neonatorum be avoided. Penicillin and streptomycin were given daily for three doses.

Large amounts of thick tenacious mucus were aspirated over the next 48 hours, and a dose of caffeine with sodium benzoate had to be given once during that time. By 24 hours the "pectus excavatum" caused by the sternal retractions was completely overcome, and the chest now expanded normally with inspiration. The apparatus was removed after 36 hours and was not needed thereafter. A mild degree of sclerema neonatorum did develop at about 24 hours. The tissues of the legs and back became hard and stiff, but this condition slowly improved and by the third day had disappeared.

The infant was fed by gavage starting on the second day of life; this was continued for three days after which the infant was able to maintain sufficient intake by nipple. No further problems arose and the baby is now progressing favorably and gaining well; he seems exceptionally vigorous. There are no neurological abnormalities. The soft tissues of the chest wall were not damaged.

DISCUSSION

It is possible that a most important factor in death from respiratory distress syndrome in infants in the newborn period is the weakness of the rib cage. A means of supporting the chest wall to prevent its collapse has been sought for a long time. Air locks have been tried with sketchy success. There have been a few previous reports of a traction apparatus to the chest wall as described above.¹⁻⁴ However, the use of such a procedure has not come into general use. In view of the incidence of sternal retraction and thoracic collapse in small infants in respiratory distress, it would seem advisable to use this method more frequently.

SUMMARY

The use of skin traction over the lower portion of the sternum for respiratory distress in the newborn period to counteract the inspiratory retraction of the chest wall is advocated. This apparatus is simple and easily available in any hospital nursery.

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The Editor's Column

THE DWINDLING INDICATIONS FOR STREPTOMYCIN IN PEDIATRICS

Prior to the advent of the broad-spectrum antibiotics, streptomycin enjoyed a considerable vogue in the treatment of Gram-negative bacterial infections in the pediatric age group. It was an important therapeutic agent in *Hemophilus influenzae* meningitis and septicemia and urinary tract infection due to Gram-negative bacilli as well as tularemia and brucellosis. However, because of the frequency of audio-vestibular damage and the rapid development of bacterial resistance, it was not surprising that, with the availability of antibiotics such as the tetracyclines and chloramphenicol, the value of streptomycin in bacterial infections other than tuberculosis would be considerably curtailed.

A few examples will serve to illustrate the point. While *H. influenzae* meningitis in times past was commonly treated with streptomycin, chloramphenicol, either alone or in combination with sulfonamides, has become the drug of choice. In urinary tract infections due to Gram-negative coliform bacilli, one would now much prefer to use either one of the tetracycline drugs or chloramphenicol when the organisms prove sensitive to these latter drugs. In infections in which *Pseudomonas aeruginosa* is a causative agent, polymyxin B or colistin (Coly-mycin®) would be preferential therapy. Where streptomycin was formerly the drug of choice in the treatment of tularemia, the tetracycline drugs and chloramphenicol are equally if not more effective. In the patient with shigellosis, one is able to eradicate the organism from the bowel with streptomycin given orally. However, in our experience in this hospital over the past several years with over 300 children diagnosed as having *Shigella* enteritis, the broad-spectrum antibiotics enjoy a definitive advantage. In salmonellosis also, our experience with streptomycin has generally been quite disappointing. Chloramphenicol given orally, either alone or in combination with oral neomycin, has been found to produce the least number of bacterial relapses.

Parenthetically, the combination of penicillin and streptomycin is still fairly commonly employed, particularly "prophylactically" or in those infections in which the etiology is not clear. This practice has little to recommend it, since in this fixed combination, the amount of penicillin is too small and the amount of streptomycin is too large for use in pediatric patients.

In summary, streptomycin has been virtually abandoned as an antibacterial agent in Children's Hospital; it would not be too far afield to state that with the exception of tuberculosis, the *bona fide* indications for

the use of streptomycin in infants and children have been substantially curtailed in recent years, and the drug has become of historic importance only.

S. R.

Book Reviews

Antibiotic Therapy for Staphylococcal Diseases. Antibiotics Monographs No. 12. Edited by HENRY WELCH, Ph.D. AND MAXWELL FINLAND, M.D., 220 pp., illustrated, New York: Medical Encyclopedia, Inc., 1959, \$4.50.

This monograph amounts to a coaches' conference for physicians who will tilt with serious staphylococcal infections. Welch and Finland, together with six of the country's most active anti-staphylococcal strategists, review the fundamentals of the game, the major strength of the opponent, staphylococcal infection, and the strength and weakness of the major antibiotics in the anti-staphylococcal field.

Given most attention are erythromycin, oleandomycin, novobiocin, vancomycin, ristocetin and kanamycin. Dr. Welch introduces the problem of staphylococcal infection; each of the contributors covers one of the antibiotics mentioned in detail; and Dr. Finland recapitulates. The reader who insists on an absolute answer will not find it here. As Dr. Finland says, "Some of the authors have emphasized the more favorable aspects and others have gone into greater detail about the less favorable aspects of the various antibiotics." However, the summarizing editor was brave enough to list in order vancomycin, ristocetin and kanamycin as drugs of choice in serious staphylococcal infections which are resistant to penicillin, erythromycin and novobiocin. Each of these drugs is best used, he feels, in combination with another. But the answer to the staphylococcal problem is not so simple as to be solved by listing drugs. One must consider the seriousness of the infection, the resistance of the organism, the age of the patient, as well as the problems of cross resistance, induction of resistance, bacteriostatic versus bactericidal effect, dosage form and absorption, toxicity and adjunctive therapy. This monograph includes both the data to allow consideration of all these factors and some "tips" from the experts on how best to use the data. As such it is most valuable for the physician who faces serious staphylococcal infections.

ROBERT H. PARROTT, M.D.

Anesthesia for Infants and Children. Edited by ROBERT M. SMITH, M.D. 418 pp., 182 illustrations. St. Louis: The C. V. Mosby Company, 1959, \$12.00.

Part of the message of this textbook is that the anesthesiologist for infants and children must be very much a pediatrician himself. But more than that, he must be an accomplished physiologist, preferably a technician with a leaning to gadgetry, an applied pharmacologist, a touch of a surgeon and, by all means, a psychologist. All levity aside, the responsibility of a children's anesthesiologist is a large and broad one. This review will concern the broad application of this field since it is likely that an accomplished children's anesthesiologist would find that his own files and experience contain as much, or more, than has been summarized by Dr. Smith.

The first several chapters of the book are devoted to a compilation of facts and figures concerning developmental anatomy, physiology and psychology in so far as these are important to anesthesia. The text is strongest on physiology and weakest on psychology. Perhaps this is because it is easier to chronicle facts on physiology and because the practice of psychology for a child is so much an art. Nonetheless, there is a growing body of information, most of it empirically derived to be true, about related phases of personality development, and this textbook brushes superficially over it.

In discussing fluid therapy, the author hints at some impatience with the biochemists or acid-base experts for introducing such an "array of combined electrolyte mixtures." In his suggested management of pyloric stenosis he steps on some of their academic toes still further. Perhaps the problem in the text is merely an attempt to over-simplify, but there are many who would question 1) the use of dextrose in water alone intravenously for dehydration, 2) the addition of normal saline by hypodermoclysis if the *dehydration is more marked*, and 3) the use of blood if the red blood cell count is below 5 million (how little below?).

The other chapters of top interest to the pediatrician are those on respiratory physiology, resuscitation, oxygen therapy and mortality in pediatric surgery. The three former represent a review of areas of knowledge frequently lacking in general pediatric training, yet frequently included in pediatric practice. These subjects are covered in broad outline with little technical detail but should be of interest to the pediatrician. The chapter on anesthetic mortality again emphasizes the responsibility of the anesthesiologist and surgeon. The figures included would be of value for any pediatrician or surgeon to review in considering broadly or specifically a problem of elective pediatric surgery. Actually the conclusion is optimistic in that, at least in the hands of anesthesiologists with the ex-

perience of Dr. Smith and the Boston Children's Medical Center staff, the mortality attributable to anesthesia alone is no greater than that in adult surgery. Any increased mortality arises from complications of immaturity or surgery itself.

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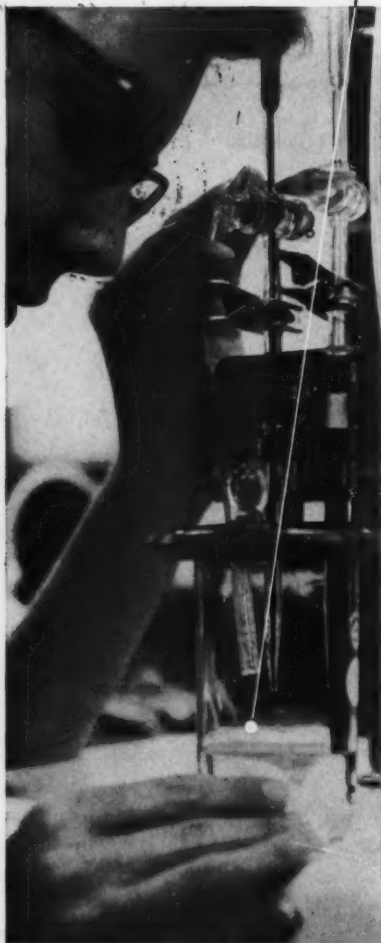
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